

AMENDMENTS TO THE CLAIMS

Claims 1-54 were pending at the time of the Office Action.

Claims 2, 16, 32, 46 and 51 are canceled herein.

Claims 1, 9, 13, 15, 18, 23-31, 36, 39, 43, 45, 50 and 54 are currently amended.

Claims 1, 3-15, 17-31, 33-45, 46-50, and 52-54 are pending after this response.

1. (Currently Amended) A computer-implemented method comprising:

converting, by a computing device, unstructured service requests comprising information that is a result of an end-user and product support engineer product communication processes, which is not based on information solely generated by a professional writer or a vendor tasked with documenting a product, to one or more structured answer objects, each unstructured service request including information to narrow product problem symptom(s) to a root cause, each structured answer object comprising hierarchically structured historic problem diagnosis data; and

in view of the product problem symptom(s):

identifying a set of the one or more structured answer data objects, each structured answer data object in the set comprising term(s) and/or phrase(s) related to the product problem symptom(s); and

providing historic and hierarchically structured problem diagnosis data from the set to an end-user for product problem diagnosis, a problem diagnosis data comprising:

a product problem description;

a product problem cause that caused a described product problem; and

a product problem resolution that resolves the described product problem by fixing a corresponding product problem cause, wherein a product problem description data field is a parent node of a product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

2. (Cancelled)

3. (Previously Presented) The method of claim 1, and wherein the problem diagnosis data comprise a link to a product support article.

4. (Previously Presented) The method of claim 1, and wherein converting the unstructured service requests, identifying the set, and providing the historic and hierarchically structured problem diagnosis data are performed by a server computing device, and wherein the method further comprises:

receiving, from a client computing device, the product problem description; and
wherein providing the historic and hierarchically structured problem diagnosis data further comprises:

searching an index for terms and/or phrases that match term(s) in the product problem description to identify the one or more structured answer objects in the set;

communicating the set to the client computing device for display by a troubleshooting wizard to the end-user.

5. **(Previously Presented)** The method of claim 1, wherein the method further comprises dynamically generating a knowledge base article from information provided by the set.

6. **(Previously Presented)** The method of claim 1, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the method further comprises:

generating an index by:

extracting features from the structured answer objects;

analyzing the features to identify the terms and the phrases; assigning relevance weight to the terms and the phrases;

normalizing terminology within the terms and the phrases; and

wherein operations for identifying the set are based on information in the index.

7. **(Previously Presented)** The method of claim 6, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the method further comprises:

clustering respective ones of the structured answer objects based on the index to group related structured answer objects; and

wherein providing the set, the set comprises a reinforced cluster of structured answer objects.

8. **(Previously Presented)** The method of claim 7, wherein clustering comprises reinforced and unified clustering operations.

9. **(Currently Amended)** A method at least partially implemented by a computing device comprising:

communicating, by a troubleshooting wizard, a search request comprising a product problem description to a server computing device;

responsive to receiving the search request, systematically presenting to a user of[[,]] the troubleshooting wizard~~allows a user to systematically present and leverage hierarchically structured~~ historical product problem diagnosis data organized by the server computing device into a hierarchical tree from structured answer data objects in view of ~~[[a]] the product problem description, the search request comprising the product problem description;~~

responsive to receiving a response to the search request, presenting, by the troubleshooting wizard, information from the response to the user, ~~user;~~ and wherein the information comprises ~~the hierarchically structured~~ historic problem diagnosis data, the historic problem diagnosis data comprising information that is a result of an end-user and product support engineer product communication processes, which is not based on information solely generated by a professional writer or a vendor tasked with documenting a product. ~~being associated with term(s) and/or phrase(s) related to the product problem description.~~

10. (Previously Presented) The method of claim 9, wherein the historic problem diagnosis data comprise any one or more of hierarchically structured product problem description(s), symptom(s), cause(s), and resolution(s).

11. (Previously Presented) The method of claim 9, wherein the information comprises a link to a product support article.

12. (Previously Presented) The method of claim 9, wherein the information comprises a set of structured answer objects.

13. (Currently Amended) The method of claim 12, wherein respective ones of the structured answer objects are clustered by the server computing device as corresponding to one another, the clustering being based on reinforced clustering operations.

14. (Previously Presented) The method of claim 13, wherein the clustering is further based on unified clustering operations.

15. (Currently Amended) A ~~tangible~~ computer-readable storage medium comprising computer-executable instructions for:

converting, by a computing device, unstructured service requests to one or more structured answer objects, each unstructured service request comprising information that is a result of an end-user and product support engineer product communication processes and including information to narrow product problem symptom(s) to a root cause, each

structured answer object comprising hierarchically structured historic problem diagnosis data; and

in view of the product problem symptom(s):

identifying a set of the one or more structured answer data objects, each structured answer data object in the set comprising terms (and/or phrases) related to the product problem symptom(s); and

providing historic and hierarchically structured problem diagnosis data from the set to an end-user for product problem diagnosis, the problem diagnosis data comprising:

a product problem description;

a product problem cause that caused the described product problem; and

a product problem resolution that resolves the described product problem by fixing the corresponding product problem cause, wherein a product problem description data field is a parent node of a product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

16. (Cancelled)

17. (Previously Presented) The computer-readable medium of claim 15, and wherein the problem diagnosis data comprise a link to a product support article.

18. (Currently Amended) The computer-readable medium of claim 15, and wherein converting the unstructured service requests, identifying the set, and providing the historic and hierarchically structured problem diagnosis data are performed by a server computing device, and wherein the computer-executable instruction further comprise instructions for:

receiving, from a client computing device, the product problem description; and
wherein providing the historic and ~~hierarchicall~~ hierarchical, structured problem diagnosis data further comprises:

searching an index for terms and/or phrases that match term(s) in the product problem description to identify the one or more structured answer objects in the set;

communicating the set to the client computing device for display by a troubleshooting wizard to the end-user.

19. (Previously Presented) The computer-readable medium of claim 15, wherein the computer-executable instruction further comprise instructions for dynamically generating a knowledge base article from information provided by the set.

20. (Previously Presented) The computer-readable medium of claim 15, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the computer-executable instruction further comprise instructions for:

generating an index by:

extracting features from the structured answer objects;

analyzing the features to identify the terms and the phrases; assigning relevance weight to the terms and the phrases; normalizing terminology within the terms and the phrases;
and wherein identifying the set is based on information in the index.

21. (Previously Presented) The computer-readable medium of claim 20, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the computer-executable instruction further comprise instructions for:

clustering respective ones of the structured answer objects based on the index to group related structured answer objects; and

wherein providing the set, the set comprises a reinforced cluster of structured answer objects.

22. (Previously Presented) The computer-readable medium of claim 21, wherein clustering comprises reinforced and unified clustering operations.

23. (Currently Amended) A ~~tangible~~ computer-readable storage medium comprising computer-executable instructions executable on a computing device for:

communicating, by a troubleshooting wizard, a search request comprising a product problem description to a server computing device, ~~the troubleshooting wizard allows a user to systematically present and leverage hierarchically structured historical~~

~~product problem diagnosis data from structured answer data objects in view of a product problem description, the search request comprising the product problem description; and~~
responsive to receiving a response to the search request, presenting, by the troubleshooting wizard, information from the response to the user, ~~the information comprising the hierarchically structured~~ wherein the information is derived from end-user and product support engineer product communication processes, and which is not based on information solely generated by a professional writer or vendor tasked with documenting a product problem, and wherein the information comprises:

a product problem description;

a product problem cause that caused a described product problem; and

a product problem resolution that resolves the described product problem by fixing a corresponding product problem cause, wherein a product problem description data field is a parent node of a product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

24. (Currently Amended) The computer-readable storage medium of claim 23, wherein the historic problem diagnosis data comprise any one or more of hierarchically structured product problem description, symptom, cause, and resolution information.

25. (Currently Amended) The computer-readable storage medium of claim 23, wherein the information comprises a link to a product support article.

26. (Currently Amended) The computer-readable storage medium of claim 23, wherein the information comprises a set of structured answer objects.

27. (Currently Amended) The computer-readable storage medium of claim 26, wherein respective ones of the structured answer objects were clustered by the server computing device as corresponding to one-another, the clustering being based on reinforced clustering operations.

28. (Currently Amended) The computer-readable storage medium of claim 27, wherein the clustering is further based on unified clustering operations.

29. (Currently Amended) A computer-readable storage medium comprising a structured answer object data structure for use in product problem analysis and diagnosis, the structured answer object data structure comprising:

- a product problem description data field;
- a product problem cause data field;
- a product problem resolution data field; and

wherein the product problem description data field is a parent node of the product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

30. (Currently Amended) The computer-readable storage medium of claim 29, wherein the structured answer object data structure further comprises a product problem

symptom data field, the product problem description field being a parent node of the product problem symptom data field.

31. (Currently Amended) A computing device comprising:

a processor; and

a memory coupled to the processor, the memory comprising computer-program instructions executable by the processor for:

converting, by a computing device, unstructured service requests to one or more structured answer objects, each unstructured service request comprises information that is a result of an end-user and product support engineer product communication processes, which is not based on information solely generated by a professional writer or vendor tasked with documenting a product, and includes ~~including~~ information to narrow product problem symptom(s) to a root cause, each structured answer object comprising hierarchically structured historic problem diagnosis data; and

in view of the product problem symptom(s):

identifying a set of the one or more structured answer data objects, each structured answer data object in the set comprising term(s) and/or phrase(s) related to the product problem symptom(s); and

providing historic and hierarchically structured problem diagnosis data from the set to an end-user for product problem diagnosis, the problem diagnosis data comprising:

a product problem description;

a product problem cause that caused the described product problem; and

a product problem resolution that resolves the described product problem by fixing the corresponding product problem cause, wherein a product problem description data field is a parent node of a product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

32. (Cancelled)

33. (Previously Presented) The computing device of claim 31, and wherein the problem diagnosis data comprise a link to a product support article.

34. (Previously Presented) The computing device of claim 31, and wherein converting the unstructured service requests, identifying the set, and providing the historic and hierarchically structured problem diagnosis data are performed by a server computing device, and wherein the computer-executable instruction further comprise instructions for:

receiving, from a client computing device, the product problem description; and
wherein providing the historic and hierarchically structured problem diagnosis data further comprises:

searching an index for terms and/or phrases that match term(s) in the product problem description to identify the one or more structured answer objects in the set;

communicating the set to the client computing device for display by a troubleshooting wizard to the end-user.

35. (Previously Presented) The computing device of claim 31, wherein the computer-executable instruction further comprise instructions for dynamically generating a knowledge base article from information provided by the set.

36. (Currently Amended) The computing device of claim 31, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the computer-executable instruction further comprise instructions for:

generating an index by:

extracting features from the structured answer objects;

analyzing the features to identify the ~~terms~~ terms and the phrases;

assigning relevance weight to the terms and the phrases;

normalizing terminology within the terms and the phrases; and

wherein identifying the set is based on information in the index.

37. (Previously Presented) The computing device of claim 36, wherein after converting the unstructured service requests and before identifying the set and providing the historic and hierarchically structured problem diagnosis data, the computer-executable instruction further comprise instructions for:

clustering respective ones of the structured answer objects based on the index to group related structured answer objects; and

wherein providing the set, the set comprises a reinforced cluster of structured answer objects.

38. (Previously Presented) The computing device of claim 37, wherein clustering comprises reinforced and unified clustering operations.

39. (Currently Amended) A computing device comprising:

a processor; and

a memory coupled to the processor, the memory comprising computer-program instructions executable by the processor for:

communicating, by a troubleshooting wizard, a search request comprising a product problem description to a server computing device;

responsive to receiving a response to the search request, systematically presenting to a user of[[,]] ~~the troubleshooting wizard allows a user to systematically present and leverage hierarchically structured historical product problem diagnosis data~~ organized by the server computing device into a hierarchical tree from structured answer data objects in view of [[a]] the product problem description, ~~the search request comprising the product problem description~~; and

responsive to receiving a response to the search request, presenting, by the troubleshooting wizard, information from the response to the user, the information comprising ~~the hierarchically structured~~ historic problem diagnosis data, the historic

problem diagnosis data comprising information that is a result of an end-user and product support engineer product communication processes, which is not based on information solely generated by a professional writer or vendor tasked with documenting a product. ~~being associated with term(s) and/or phrase(s) related to the product problem description.~~

40. (Previously Presented) The computing device of claim 39, wherein the historic problem diagnosis data comprise any one or more of hierarchically structured product problem description, symptom, cause, and resolution information.

41. (Previously Presented) The computing device of claim 39, wherein the information comprises a link to a product support article.

42. (Previously Presented) The computing device of claim 39, wherein the information comprises a set of structured answer objects.

43. (Currently Amended) The computing device of claim 42, wherein respective ones of the structured answer objects were clustered by the server computing device as corresponding to one-another, the clustering being based on reinforced clustering operations.

44. (Previously Presented) The computing device of claim 43, wherein the clustering is further based on unified clustering operations.

45. (Currently Amended) A computing device comprising:

means for converting unstructured service requests comprising information that is a result of an end-user and product support engineer product communication processes, which is not based on information solely generated by a professional writer or vendor tasked with documenting a product, to one or more structured answer objects, each unstructured service request including information to narrow product problem symptom(s) to a root cause, each structured answer object comprising hierarchically structured historic problem diagnosis data; and

in view of a product problem description:

means for identifying a set of the one or more structured answer data objects, each structured answer data object in the set comprising term(s) and/or phrase(s) related to the product problem description; and

means for providing historic and hierarchically structured problem diagnosis data from the set to an end-user for product problem diagnosis, the problem diagnosis data comprising:

a product problem description;

a product problem cause that caused the described product problem; and

a product problem resolution that resolves the described product problem by fixing the corresponding product problem cause, wherein a product problem description data field is a parent node of a product problem cause data field, and the product problem cause data field is a parent node of the product problem resolution data field.

46. (Cancelled)

47. (Previously Presented) The computing device of claim 45, and wherein the problem diagnosis data comprise a link to a product support article.

48. (Previously Presented) The computing device of claim 45, and further comprising:

means for receiving, from a client computing device, the product problem description; and

wherein the means for providing the historic and hierarchically structured problem diagnosis data further comprises:

means for searching an index for terms and/or phrases that match term(s) in the product problem description to identify the one or more structured answer objects in the set; and

means for communicating the set to the client computing device for display by a troubleshooting wizard to the end-user.

49. (Previously Presented) The computing device of claim 45, further comprising means for dynamically generating a knowledge base article from information provided by the set.

50. (Currently Amended) A computing device comprising:

means for processing;

means for storing computer-program instructions executable by the processor;

means for communicating a search request to a server computing device, the means ~~allowing~~ enabling a user to ~~systematically present~~ communicate a product problem description; and ~~and leverage hierarchically structured historical product problem diagnosis cause and resolution data from structured answer data objects in view of a product problem description, the search request comprising the product problem description; and~~

responsive to receiving a response to the search request, means for presenting information from the response to the user, the information comprising ~~[[the]]~~ hierarchically structured historic problem ~~diagnosis~~ cause and resolution data, the historic problem ~~diagnosis~~ cause and resolution data being associated with term(s) and/or phrase(s) related to the product problem description, wherein the product problem description is the parent of the corresponding historic problem cause data, and the historic problem cause data are parents of the corresponding historic problem resolution data.

51. (Cancelled)

52. (Previously Presented) The computing device of claim 50, wherein the information comprises a link to a product support article.

53. (Previously Presented) The computing device of claim 50, wherein the information comprises a set of structured answer objects.

54. (Currently Amended) The computing device of claim 53, wherein respective ones of the structured answer objects were clustered by the server computing device as corresponding to one another.